COMMON SECOND REVISION TEST - 2023

Standard XI Reg.No

PHYSICS

Part - I

Time: 3.00 hours ***Marks: 70***

I. Choose the correct answer: **15 x 1 = 15**

1. The dimensional formula of Planck's Constant h is
   a) $[ML^2T^{-1}]$ b) $[ML^2T^{-3}]$ c) $[MLT^{-1}]$ d) $[ML^3T^{-3}]$
2. If a particle executes uniform circular motion, choose the correct statement.
   a) the velocity and speed are constant b) the acceleration and speed are constant
   c) the velocity and acceleration are constant
   d) the speed and magnitude of acceleration are constant
3. The masses m_1 are m_2 are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration a_1/a_2 is
   a) 1 b) less than 1 c) greater than 1 d) all the three cases
4. A body of mass 4m is lying in xy-plane at rest. It suddenly explodes into three pieces. Two pieces each of mass 'm' move perpendicular to each other with equal speed v. The total kinetic energy generated due to explosion is
   a) mv^2 b) $\frac{3}{2}mv^2$ c) $2\ mv^2$ d) $4\ mv^2$
5. The centre of mass of a system of particles does not depend upon
   a) position of particles b) relative distance between particles
   c) masses of particles d) force acting on particle
6. From a disc of radius R, a mass M, a circular hole of diameter R, whose rim passes through the center is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis passing through it.
   a) $15\ MR^2/32$ b) $13\ MR^2/32$ c) $11\ MR^2/32$ d) $9\ MR^2/32$
7. If a person moves from Chennai to Trichy, his weight
   a) increases b) decreases
   c) remains same d) increases and then decreases
8. The efficiency of a heat engine working between the freezing point and boiling point of water is
   a) 6.25% b) 20% c) 26.8% d) 12.5%
9. A small sphere of radius 2 cm falls from rest in a viscous liquid. Heat is produced due to viscous force. The rate of production of heat when the sphear attains its terminal velocity of proportional to a) 2^2 b) 2^3 c) 2^4 d) 2^5
10. The ratio $\upsilon = \frac{C_p}{C_v}$ for a gas mixture consisting of 8 g of helium and 16 g of oxygen is
    a) $23/15$ b) $15/23$ c) $27/17$ d) $17/27$
11. In a simple harmonic oscillation, the acceleration against displacement for one complete oscillation will be,
    a) an ellipse b) a circle c) a parabola d) a straight line
12. A sound wave whose frequency is 5000 Hz travels in air and then hits the water surface. The ratio of its wavelengths in water and air is
    a) 4.30 b) 0.23 c) 5.30 d) 1.23
13. A particle of mass 'm' is circulating on a circle of radius r having angular momentum 'L'. then the centripetal force will be
    a) L^2/mr b) L^2m/r c) L^2/mr^3 d) L^2/mr^2

14. If two soap bubbles of different radii are in communication with each other, then
    a) air flows from larger bubble into smaller one
    b) the size of the bubble remains the same
    c) air flows from the smaller into larger one and the larger bubble grows at the expense of smaller one
    d) the air flows from the large
15. In SHM velocity in equilibrium position is
    a) minimum b) constant c) maximum d) zero

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory) **6 x 2 = 12**

16. Write the Kinematic equations of motion for constant acceleration.
17. What are the methods of reducing friction?
18. What is the difference between sliding and slipping?
19. Define gravitational potential energy.
20. Define Poison's ratio.
21. State Stefan-Boltzman law.
22. List the factors affecting mean free path.
23. What are longitudinal waves.
24. Two objects of masses 2 kg and 4 kg are moving with the same momentum of 20 kg ms^{-1}.
    (i) Will they have same kinetic energy?

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory) **6 x 3 = 18**

25. What are the limitations of dimensional analysis?
26. Write down the properties of vector product.
27. Briefly explain centripetal force with example.
28. Difference between conservative and non-conservative force.
29. State and prove perpendicular axis theorem.
30. Give the equation of state for an isothermal process.
31. Describe the total degrees of freedom for monatomic and diatomic molecule.
32. State the law of transverse vibration in stretched string.
33. The length of the simple pendulum increases 44% from its initial value. Then what is the percentage of increases in time period of the pendulum.

Part - IV

IV. Answer all the questions. **5 x 5 = 25**

34. a) Derive the expression for centripetal acceleration. ***(OR)***
    b) Write down the postulates of kinetic theory of gases.
35. a) Describe the method of measuring the angle of repose. ***(OR)***
    b) Derive the expression for the terminal velocity of a sphere using Stoke's formula.
36. a) Calculate moment of inertia for a rod about its centre and perpendicular to the rod.
    (OR)
    b) Explain horizontal oscillations of a spring.
37. a) Calculate variation of 'g' with depth. ***(OR)***
    b) Explain Carnot heat engine, obtain its efficiency.
38. a) State and prove work energy theorem. ***(OR)***
    b) What are stationary wave? List out the characteristics of stationary waves.

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